SEC. 9. At all second-class stations six daily meteorological observations shall be made at times to be specified by the Director, and the results for each month shall be compiled and forwarded to the central station before the end of the next succeeding month. Such daily telegraphic reports of the state of the weather shall be forwarded to the central station as the Director may require. Monthly crop reports shall be forwarded to the central station by mail.

SEC. 10. At all third-class stations two daily meteorological observations shall be made, at hours to be fixed by the Director. They shall be forwarded to Manila by wire, if possible, otherwise by mail. Monthly crop reports shall be forwarded by mail.

SEC. 11. At all rain stations there shall be recorded the daily maximum and minimum temperature, barometric readings at 6 a. m. and 2 p. m., and daily rainfall. Reports from rain stations shall be forwarded by mail to the central station, together with monthly crop reports.

SEC. 12. Officers or employees of the Bureau employed in the establishment of stations shall be allowed their actual and necessary traveling expenses and the actual cost of transportation of instruments, apparatus, and shelters for the same. The nine first-class stations shall be established by the Director immediately, and the other stations authorized in Section 6 as soon as practicable. Employees for the several stations shall be appointed as they are established.

SEC. 13. The officers and employees of the weather bureau shall make such observations and reports on astronomical, magnetic, and seismic phenomena as the Director may prescribe. The results of such observations may be included in the monthly reports when their publication is deemed desirable by the Director.

SEC. 14. The Director shall cause standard time to be furnished to the city of Manila at noon daily, and to all branch stations in telegraphic communication with the central station at 11 a. m., daily. He shall further provide for the free rating of all chronometers brought to the Manila Observatory for this purpose.

SEC. 15. The following sums in money of the United States are hereby appropriated for the purposes named:

(*a*) For the purchase of additional instruments and apparatus for the equipment of nine (9) first-class stations, and for suitable shelters for the same, one thousand, seven hundred and eight dollars and fifty cents ($1,708.50).

(*b*) For the erection of shelters and the installation of instruments for nine (9) first-class stations, five hundred dollars ($500.)

(*c*) For the purchase of instruments and apparatus sufficient to equip twenty-five (25) second-class stations, for shelters for the same and for cost of installation, four thousand, two hundred and fifty dollars ($4,250).

(*d*) For the purchase of instruments and apparatus sufficient to equip seventeen (17) third-class stations, and for the installation of the same, one thousand and eighty-eight dollars ($1,088).

(*e*) For the purchase of instruments and apparatus sufficient to equip twenty (20) rain stations, five hundred and twenty dollars ($520).

SEC. 16. This act shall take effect on its passage.

Enacted, May 22, 1901.

THE AUTUMN HAZE.

In reply to a letter asking the Chief of Bureau as to the nature of the haze or hazy weather called Indian Summer, the following has been sent:

The dry haze is undoubtedly due to fine particles of dust. The finest dust is composed of one or all of the following substances, namely, fine particles of soil or the dead leaves of plants, smoke, or ashes from wood fires, salt from the ocean spray, the shells or scales of microscopic silicious diatoms, germs of fungi, spores of ferns, pollen of flowers, etc. In the still air of damp nights these dust particles settle slowly down, or rapidly if they gather dew on themselves, and the morning air is comparatively clear. During the daylight the sun warms the soil which heats the adjacent air and the rising currents carry the dust up as high as they go. Up to this height the air becomes more and more dusty day after day depending on the balance between the settling by night and the rising by day. If a general wind is blowing this will bring an abundance of fresh air, and the haze is generally diminished thereby in intensity but spread over a large area of ground. If there be no general wind, as for instance in the midst of areas of high pressure (where the daytime is warm, dry, and clear), then the layer of dust reaches higher and higher each successive day; during long, dry summers in India it rises to 3,000 5,000 and 7,000 feet with a well defined upper surface that is higher in the daytime than at night-time. This is a general explanation of dry-haze weather, and applies to Indian Summer as well as to all occasional areas of high pressure. The reason why we have more of it in the autumn is because there is then less horizontal wind and less rising air. The reason for the diminished horizontal wind is probably found in the general circulation of the atmosphere. The reason for the feebler vertical ascending currents is because the surface of the ground is not then heated warm enough by the sun relative to the temperature of the air to make such strong ascending currents as occur in midsummer.

THE MOON AND THE WEATHER.

We print on page 372 an interesting letter under the above title from the venerable Levi W. Meech, of Norwich, Conn., well known to American meteorologists by his laborious work On the Relative Intensity of the Heat and Light of the Sun received by the Earth at different Latitudes, and published by the Smithsonian Institution in 1856. Mr. Meech was at that time, as he has always been, a high authority on the mathematical principles that underlie the business of the actuary of a life insurance company, and this mathematical memoir was but a side issue in his life work. The article now published shows that long since he executed a computation that would undoubtedly bring out the influence of the moon on atmospheric phenomena if it could be applied to normal values for a large number of stations representing the whole earth. The present communication illustrates the form of the result that would be given by each station, but the question as to whether all data conspire to show the existence of a lunar influence must not be inferred prematurely from the evidence furnished by one station for one year. If temperature formulæ were at hand for many stations during the period September, 1853–April, 1855, for which Mr. Meech has computed the formula for Dr. Kane's station, we should naturally compare together the different sets of coefficients of the terms containing the sine and cosine of m, as also of $2m$, $3m$, etc.; the average of all for the whole earth would show the influence of the moon. When we have but one station formula we can only ask what are the "probable errors" of the coefficients of sine and cosine m. On this point, unfortunately, Mr. Meech gives us no information.

A new journal, now published in St. Petersburg, is devoted to the exploitation of the lunar influence, and seems to assume that it must necessarily be large and important. It has lately printed a general review of the literature of the subject, but as is generally well known, every exact investigation throws doubt upon the subject whether the moon has any importance in meteorology. Perhaps the moon ought to influence the weather—but it doesn't. The controversies over this subject, waged during the 18th century, sobered down during the 19th century to the general conviction that the moon's influence is so slight that we really ought not to waste our time discussing it so long as the solar influence claims our undivided attention. It is to be hoped that dur-

ing the 20th century meteorologists will give increasing attention to the solar heat, atmospheric moisture, the rotation of the earth, and other important matters that enter into dynamic meteorology and will not revive a useless discussion as to the influence of the moon on the weather. Its real, but very slight, influence on the semimonthly atmospheric tides seems to be a matter of interest to mathematicians rather than to meteorologists. The excellent review of our knowledge of the lunar influence, given by van Bebber in the first chapter of his Handbook of Practical Meteorology, ought to suffice for the present.

METEOROLOGY IN MADAGASCAR.

As the progress of meteorology depends largely upon the maintenance of records in the out of the way places of the world and on the ocean vessels in order that we may fill up the great gaps in the daily weather map of the world, we take pleasure in the announcement that the meteorological system of Madagascar has been reestablished, with its headquarters at the mission station and observatory at Tananarivo, the capital of Madagascar. The new observatory is being rebuilt on the site of the old observatory, about a mile and a half east of the capital on the summit of a barren hill, and resumed its work in July, 1899, at least in part. So far as possible, the building stones that were overturned in the revolution of 1895 have been again utilized. The institution is still in charge of its original director, Father Colin, of the Roman Catholic Mission. This constitutes a most important station for the observation, study, and prediction of the typhoons of the southern Indian Ocean. Further details will be found in an article by W. H. Hunt in the Bulletin of the American Geographical Society, July, 1901, page 204.

POPULAR ERRORS IN METEOROLOGY AND GEOGRAPHY.

In the Bulletin of the American Geographical Society, Vol. XXXIII, No. 3, July, 1901, page 259, we find an admirable article by Mr. Henry Gannett entitled "Certain persistent errors in geography." Some of the items mentioned by him pertain specifically to meteorology, which subject is often treated as one of the children, whereas it is really the parent of the many lines of study included under the word geography. In the intellectual progress of a nation there can be nothing more important than the eradication of errors from the children's text-books, and this will never be done so long as compilers and publishers find it to their advantage to occasionally introduce popular fictions or hazy theories instead of sound knowledge. It is a very common complaint on the part of advanced students that "old legends which were taught as truths a generation or more ago still survive in the text-books, and are still accepted by the great mass of the people." It ought not to be necessary to reconcile ourselves to the idea that "still another generation will pass before the truth will filter down from geographers into the text-books and from the text-books to the people." Every school board of trustees would do well to have a committee on revision of text-books, and to insist that revised editions be furnished. He is a benefactor to the people who eradicates weeds from the farm and errors from the mind.

Although Mr. Gannett's remarks on the influence of forests on rainfall, the influence of the Japan Current, and the Gulf Stream are analogous to some that have appeared in the MONTHLY WEATHER REVIEW, yet we think it well to reprint them as an admirable contribution to the campaign of truth against error:

"*Forests and rainfall.*—An example of the persistence of error is the idea that the presence or absence of forests has an influence upon the amount of rainfall. Some keen observer long ago detected the fact that forested regions enjoyed a a heavier rainfall than those not forested, and jumped to the conclusion that rainfall was produced by forests, and, as a corollary, that the removal of forests diminished the rainfall. Looking over the earth he found many treeless, desert, and semidesert regions, and forthwith instanced them as frightful examples of the result of man's wastefulness in destroying the the forests. Prominent among these examples are the shores of the Mediterranean, including the Iberian Peninsula, Italy, northern Africa, and Syria, which are often quoted as favorite illustrations of man's destruction of climate by his destruction of the forests.

"In reply to this charge man can certainly plead not guilty. If his accusers had possessed a little more knowledge of the causes of climate and the conditions which modify it, they would have seen at once that the geography of this Mediterranean region, the present configuration of the land and water, and the prevailing winds are such as to give it a light rainfall—forests or no forests. Furthermore, a knowledge of physiography would have taught them, in corroboration of the above, that the arid or semiarid conditions now existing must have existed for many thousands, if not millions, of years, for the mountains, cliffs, and canyons are such as are carved only in arid regions, are not those of a moist climate, and these forms have not been made in a day. The situation is simply that the cart has been placed before the horse. Want of rain prevents the growth of trees; want of trees does not prevent rain. This position is generally accepted among physical geographers but the majority of the people still reverse cause and effect.

"*Forests and floods.*—A persistent, widespread, and well-rooted error is the belief that floods in our rivers are greater and more frequent than formerly, and that this is due to the removal of forests from their drainage areas. Every great flood induces another flood of editorial paragraphs in the newspapers to the effect that man, by clearing away forests, has increased the flood height of streams, and correspondingly diminished the low water flow.

"It is probable, although it has not been proved, that the clearing of land by cutting away the forests and undergrowth, does change the regimen of streams, increasing their flood height and dimishing the flow at low stages. In other words, water probably runs off or evaporates more rapidly from bare ground than from ground which is covered with trees or other forms of vegetation. But where the forests are cut away the land is seldom left bare; it is cultivated or quickly becomes covered with bushes which hold the water quite as effectively as forests.

"The main fact, however, is that the floods in our rivers are no greater or more frequent now than in the past. The Ohio River, for instance, has been gaged continuously for many years, and these gagings show no appreciable change in regimen, whatever changes may have been made in the forest cover of its basin.

"In the school geographies we are taught that the fiords of the coast of Norway, those deep gorges partly filled by the sea, are proof that the coast has been sinking. How could such canyons be cut, it is asked, unless at the time of their construction they were above sea level? But to-day, on the coast of Alaska, we see just such canyons in course of construction below sea level. On this coast are scores of glaciers traveling in gorges, which near their lower ends are many hundred feet below the level of the sea. The Muir Glacier, where its front meets the sea, is over 800 feet thick, 600 feet of which is below the level of the water, and this, like all other glaciers, is constantly carving its bed deeper. The Nor-